

TO: Mayor and Council

Interim City Manager

FROM: Rebecca Underhill, Director of Finance

DATE: February 28, 2014

SUBJECT: Water Meter Project Analysis

On March 28, 2012, Acting City Manager Mike Loftin submitted a memo to Mayor and Council in regards to the proposed Water Meter Replacement Project. (See attachment B for a copy of the memo). That memo contained, among other items, the following information:

- The total Water Meter Project cost for the replacement of current meters with Sensus meters
- A cost benefit analysis demonstrating the period of time required to recover the City's investment in the Sensus meters
- Projected savings expected to be realized with installation of the Sensus meters

With the completion of this project, we would like to follow-up on the projections as well as highlight a few other items:

Total Project Cost

- The total project cost including design, fiber, meters, and installation was estimated to be \$9.94 million
- Total actual costs are estimated to be \$9.29 million; a savings of \$649,470

 As detailed on this the bulk of the savings is from installation. This is a result of anticipating a greater number of the larger, more costly meters to be installed. In reality fewer of these meters

Item	Budget	Actual	Actual (Over)/Under Budget
Design Contract	\$ 128,550	\$ 73,697	\$ 54,854
Fiber	56,200	56,200	-
Meters	7,823,834	7,838,135	(14,301)
Installation	1,740,502	1,264,520	475,982
Contingency	190,000	57,065	132,935
	\$ 9,939,086	\$ 9,289,616	\$ 649,470

and more of smaller, lower cost meters were installed.

Cost Benefit Evaluation Based on Actual Costs

- Initial phasing for this project, as approved in the FY12-16 CIP, was a two-year phasing in fiscal years 2013 and 2014. With savings negotiated from the initial cost of this project along with savings realized during the project, 90% of this project was completed in FY13 instead of phasing the project in two fiscal years. The \$4.1 million in actual costs over the estimated cost in FY13 is a direct result of the project being completed in a little more than a year instead of the two-year period.
- The cost benefit analysis for this project provided to Council in March 2012 projected a total cumulative estimated cost of \$23.6 million for both operating and capital costs over a 10 year period (FY13-22).
- With the project now completed along with accounting for actual costs in FY12 and FY13 and a more realistic budget for FY14, the projected cumulative cost over the 10 year period is now expected to be \$21.1 million. (See attachment A for the detail of both the actual and estimated costs.)
- This is a savings of \$2.5 million over the 10 year cumulative cost estimate that was presented to Council in March 2012. That report also projected savings of \$4.17 million over the existing system; these updated costs increase that savings estimate to \$6.67 million over ten years.

SENSUS OPTION	FY2013 Actual Costs	FY2014 Budget	FY2015 Forecast	FY2016 Forecast	FY2017 Forecast	FY2018 Forecast	FY2019 Forecast	FY2020 Forecast	FY2021 Forecast	FY2022 Forecast
SENSUS Cumulative ACTUAL Cost Net Present Value	\$10,856,507	\$12,387,981	\$13,434,175	\$14,479,338	\$15,539,940	\$16,616,668	\$17,709,999	\$18,819,524	\$19,945,825	\$21,089,412
SENSUS OPTION - ESTIMATE as Reported in March 2012	\$6,801,827	\$12,414,715	\$13,749,365	\$15,085,510	\$16,442,347	\$17,819,470	\$19,217,415	\$20,637,000	\$22,077,443	\$23,539,499
Actual Costs Over/(Under) Projected Costs	\$4,054,680	(\$26,735)	(\$315,190)	(\$606,172)	(\$902,407)	(\$1,202,803)	(\$1,507,416)	(\$1,817,476)	(\$2,131,618)	(\$2,450,087)

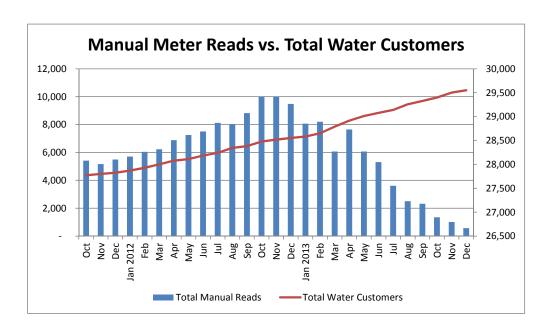
Detail of Projected Savings

• **Savings on contracted personnel**: With the installation of the Sensus meters, a savings of \$200,000 was projected in contracting additional personnel to assist with manual meter reads. This contract was reduced from \$189,600 in FY2012 to \$83,700 in

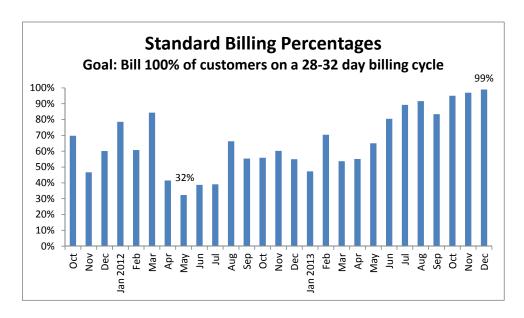
- FY2013 and reduced even further in FY2014 with a budget of \$2,500. Of the \$200,000 projected in savings; we realized a savings of \$187,000 over the two year period.
- **Reduction in field personnel's system maintenance work**: A savings of \$15,000 was projected and realized in the system maintenance required of personnel in FY13.
- Reduction in number of Customer Service Technicians: With the efficiency of the Sensus meters, we have decreased our full-time equivalents for customer service technicians from five to four and continue to assess for additional reductions in the future

Other Efficiencies worth Noting

- Faster Customer Service for our Citizens: Utilizing the Neptune meters, the length of time necessary to respond to a citizen's billing question was two to three days depending on the nature of the call and the need for the customer service technicians to physically re-read the meter. With the Sensus meters, the length of time to respond to a citizen's inquiry can now be minutes; in addition, we now have the ability to email the citizen results and usage charts.
- Manual Meter Reads: With the efficiency of the Sensus meters over the Neptune
 meters, manual meter reads have decreased from a high of 9,482 manual reads in
 December 2012 to only 575 manual reads in December 2013. While total water
 customers continue to increase 3.2 percent, with efficiency of the Sensus meters manual
 meter reads have significantly decreased allowing our customer service technicians to
 be more efficient.



• Consistent Billing: In order to achieve consistent billing the goal is to bill 100 percent of all customers within a 28-32 day billing cycle. Billing on a 28-32 billing cycle has increased from a low in May 2012 of 32% to a high in December 2013 of 99%.



Attachments:

- A Detailed schedule of actual and estimated costs
- B Memo provided to Council in March 2012

COST BENEFIT ANALYSIS WATER METER INSTALLATION PROJECT

SENSUS OPTION - Post Meter Project Completed Report	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022
	Actual Costs	Actual Costs	Budget	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
OPERATING COSTS	202 225	074.545	202 722	222 222	204.000	222.222	202.222	040.000	207.000	007.000	0.47.700
Phone Customer Service	289,605	271,545	282,780	282,800	291,300	300,000	309,000	318,300	327,800	337,600	347,700
Growth Adjustment	202 225	074 500	0.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Adjusted Phone Customer Service	289,605	271,500	282,800	291,300	300,000	309,000	318,300	327,800	337,600	347,700	358,100
CPI Adjustment	1.000	1.000	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219
Adjusted Phone Customer Service wh CPI	289,605	271,500	282,800	298,600	315,300	332,800	351,400	371,100	391,600	413,400	436,500
Field Customer Service	129,565	96,074	78,176	78,200	60,500	42,300	43,600	44,900	46,200	47,600	49,000
Growth Adjustment			0.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Program savings	400 505	00.400	70.000	(20,000)	(20,000)	40.000	44.000	40.000	47.000	40.000	50.500
Adjusted Field Customer Service	129,565	96,100	78,200	60,500	42,300	43,600	44,900	46,200	47,600	49,000	50,500
CPI Adjustment	1.000	1.000	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219
Adjusted Field Customer Service wh CPI	129,565	96,100	78,200	62,000	44,500	47,000	49,600	52,300	55,200	58,300	61,600
Connections/ Disconnects	219,133	214,476	155,199	155,200	159,900	164,700	169,600	174,700	179,900	185,300	190,900
Growth Adjustment	040 400	011500	0.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Adjusted Connections/ Disconnects	219,133	214,500	155,200	159,900	164,700	169,600	174,700	179,900	185,300	190,900	196,600
CPI Adjustment	1.000	1.000	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219
Adjusted Connections/ Disconnects wh CPI	219,133	214,500	155,200	163,900	173,100	182,700	192,900	203,600	214,900	227,000	239,700
System Maintenance	289,692	259,888	171,086	171,100	176,200	181,500	186,900	192,500	198,300	204,200	210,300
Growth Adjustment				3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Program savings			0	0	0	0	0	0	0	0	0
Adjusted System Maintenance	289,692	259,900	171,100	176,200	181,500	186,900	192,500	198,300	204,200	210,300	216,600
CPI Adjustment	1.000	1.000	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219
Adjusted System Maintenance wh CPI	289,692	259,900	171,100	180,600	190,800	201,300	212,500	224,500	236,900	250,000	264,000
Meter Reading	595,791	517,876	491,415	491,400	506,100	521,300	536,900	553,000	569,600	586,700	604,300
Growth Adjustment			0.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Program savings			0	0	0	0	0	0	0	0	0
Adjusted Meter Reading	595,791	517,900	491,400	506,100	521,300	536,900	553,000	569,600	586,700	604,300	622,400
CPI Adjustment	1.000	1.000	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219
Adjusted Meter Reading wh CPI	595,791	517,900	491,400	518,800	547,900	578,200	610,500	644,800	680,600	718,500	758,700
TOTAL ADJUSTED OPERATING COSTS WITH CPI	1,523,786	1,359,900	1,178,700	1,223,900	1,271,600	1,342,000	1,416,900	1,496,300	1,579,200	1,667,200	1,760,500
CAPITAL COSTS											
Meter Replacement Project	\$1,319,495	\$7,426,413	\$543,708								
CPI Adjustment	1.000	1.000	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219
Inflated Meter Replacement	\$1,319,000	\$7,426,000	\$544,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
ANNUAL COSTS	\$2,842,786	\$8,785,900	\$1,722,700	\$1,223,900	\$1,271,600	\$1,342,000	\$1,416,900	\$1,496,300	\$1,579,200	\$1,667,200	\$1,760,500
CUMULATIVE COST	\$2,842,786	\$11,628,686	\$13,351,386	\$14,575,286	\$15,846,886	\$17,188,886	\$18,605,786	\$20,102,086	\$21,681,286	\$23,348,486	\$25,108,986
SENSUS Cumulative ACTUAL Cost Net Present Value	4%	\$10,856,507	\$12,387,981	\$13,434,175	\$14,479,338	\$15,539,940	\$16,616,668	\$17,709,999	\$18,819,524	\$19,945,825	\$21,089,412
SENSUS OPTION - Cumulative ESTIMATE Cost Net		\$6,801,827	\$12,414,715	\$13,749,365	\$15,085,510	\$16,442,347	\$17,819,470	\$19,217,415	\$20,637,000	\$22,077,443	\$23,539,499
Present Value As Reported in March 2012 Actual Costs Over/(Under) Projected Costs		\$4,054,680	(\$26,735)	(\$315,190)	(\$606,172)	(\$902,407)	(\$1,202,803)	(\$1,507,416)	(\$1,817,476)	(\$2,131,618)	(\$2,450,087)
Actual Costs Over/(Uniter) Projected Costs		ψ+,054,000	(φ20,133)	(ψυ 1υ, 1σ0)	(ψυσυ, 172)	(ψ302,407)	(ψ1,202,003)	(ψ1,307,410)	(ψ1,017,470)	(ΨΣ, 131,010)	(Ψ2, 430,007)
Sensus Assumptions											
Annual growth rates - Affect all categories				3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Discount Rate of 4% applied to cumulative costs											
No meter replacement costs; all meters under warranty											
Effect on meter reading and billing - Eliminate drive by, and		(0100 000)	(\$400,000)								
data loading exercise as well as contract workers		(\$100,000)	(\$100,000)								
System Maintenance - Reduction of field personnel's		(045,000)									
system maintenance work (\$15,000)		(\$15,000)									
Field Customer Service - Should drop to half over three			6 0	(600,000)	(000,000)						
year period.			\$0	(\$20,000)	(\$20,000)						
NOTE: In order to obtain a realistic comparison of actual costs	to estimated cost	ts the actual costs	above include costs	associated with the	purchase of water m	eters for new const	truction.	•	•	•	

COST BENEFIT ANALYSIS WATER METER INSTALLATION PROJECT

SENSUS OPTION - As Reported in March 2012	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022
OPERATING COSTS											
Phone Customer Service	315,168	315,168	321,500	329,500	339,400	349,600	360,100	370,900	382,000	393,500	405,300
Growth Adjustment	,	2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Adjusted Phone Customer Service	315,168	321,500	329,500	339,400	349,600	360,100	370,900	382,000	393,500	405,300	417,500
CPI Adjustment	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219	1.249	1.280
Adjusted Phone Customer Service wh CPI	315,168	329,500	346,300	365,500	386,000	407,600	430,200	454,200	479,700	506,200	534,400
Field Customer Service	118,686	118,686	121,100	104,100	87,200	69,800	71,900	74,100	76,300	78,600	81,000
Growth Adjustment		2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Program Savings			(20,000)	(20,000)	(20,000)	-	-	-	-	-	-
Adjusted Field Customer Service	118,686	121,100	104,100	87,200	69,800	71,900	74,100	76,300	78,600	81,000	83,400
CPI Adjustment	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219	1.249	1.280
Adjusted Field Customer Service wh CPI	118,686	124,100	109,400	93,900	77,100	81,400	86,000	90,700	95,800	101,200	106,800
Connections/ Disconnects	171,528	171,528	175,000	179,400	184,800	190,300	196,000	201,900	208,000	214,200	220,600
Growth Adjustment		2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Adjusted Connections/ Disconnects	171,528	175,000	179,400	184,800	190,300	196,000	201,900	208,000	214,200	220,600	227,200
CPI Adjustment	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219	1.249	1.280
Adjusted Connections/ Disconnects wh CPI	171,528	179,400	188,500	199,000	210,100	221,900	234,200	247,300	261,100	275,500	290,800
System Maintenance	269,510	269,510	259,900	266,400	274,400	282,600	291,100	299,800	308,800	318,100	327,600
Growth Adjustment		2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Program Savings		(15,000)	-	-	-	-	-	-	-	-	-
Adjusted System Maintenance	269,510	259,900	266,400	274.400	282,600	291,100	299,800	308,800	318,100	327,600	337,400
CPI Adjustment	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219	1.249	1.280
Adjusted System Maintenance wh CPI	269,510	266,400	280,000	295,500	312,000	329,500	347,800	367,200	387,800	409,200	431,900
Meter Reading	665,652	665,652	579,000	493,500	508,300	523,500	539,200	555,400	572,100	589,300	607,000
Growth Adjustment	000,002	2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Program Savings		(100,000)	(100,000)	-	-	-	-	-	-	-	-
Adjusted Meter Reading	665.652	579.000	493.500	508.300	523,500	539,200	555,400	572,100	589,300	607,000	625,200
CPI Adjustment	1.000	1.025	1.051	1.077	1.104	1,132	1.160	1.189	1.219	1,249	1,280
Adjusted Meter Reading wh CPI	665,652	593,500	518,700	547,400	577,900	610,400	644,300	680.200	718,400	758,100	800,300
TOTAL ADJUSTED OPERATING COSTS WITH CPI	1,540,544	1,492,900	1,442,900	1,501,300	1,563,100	1,650,800	1,742,500	1,839,600	1,942,800	2,050,200	2,164,200
CAPITAL COSTS	.,	.,,	.,,	1,001,000	1,000,100	1,000,000	.,,	1,000,000	1,012,000	_,,,,_,	_,,
Meter Replacement		\$5,581,000	\$4,628,000								
CPI Adjustment	1.000	1.000	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219
Inflated Meter Replacement	1.000	\$5,581,000	\$4,628,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
ANNUAL COSTS		\$7.073.900	\$6,070,900	\$1,501,300	\$1,563,100	\$1,650,800	\$1,742,500	\$1,839,600	\$1,942,800	\$2,050,200	\$2,164,200
CUMULATIVE COST		\$7,073,900	\$13,144,800	\$14,646,100	\$16,209,200	\$17,860,000	\$19,602,500	\$21,442,100	\$23,384,900	\$25,435,100	\$27,599,300
		\$1,013,900	\$13,144,000	\$14,040,100	\$10,209,200	\$17,000,000	\$19,602,300	\$21, 44 2,100	\$23,364,900	\$25,435,100	\$21,599,500
SENSUS Cumulative ESTIMATED Cost Net Present Value As Reported in March 2012	4%	\$6,801,827	\$12,414,715	\$13,749,365	\$15,085,510	\$16,442,347	\$17,819,470	\$19,217,415	\$20,637,000	\$22,077,443	\$23,539,499
Baseline Assumptions		\$0,001,027	\$12,414,713	\$13,749,303	\$13,003,310	\$10,442,347	\$17,013,470	\$13,217,413	φ20,037,000	\$22,077,443	Ψ20,009,499
Annual growth rates - Affect all categories		2.0%	2.5%	2.00/	3.0%	2.00/	3.0%	3.0%	2.00/	2.00/	3.0%
Discount Rate of 4% applied to cumulative costs		2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Discount Rate of 4% applied to cumulative costs							+				
No meter replacement costs - All meters under warranty											
Effect on meter reading and billing - Eliminate drive by, and		(\$100,000)	(\$100,000)								
data loading exercise as well as contract workers		(\$100,000)	(\$100,000)								
System Maintenance - Reduction of field personnel's											
system maintenance work (\$15,000); Net adjustment of		(\$15,000)									
software Maintenance of software (\$10K Neptune less \$6K		(\$15,000)									
Sensus) is included.											
Field Customer Service - Should drop to half over three			(\$20,000)	(\$20,000)	(#30,000)						
year period.			(\$20,000)	(\$20,000)	(\$20,000)						



MEMORANDUM

To: Mayor and City Council

From: Michael W. Loftin, Acting City Manager

Subject: Water Meter Project

Date: March 28, 2012

On Monday evening, January 23, we presented City Council with a proposal to replace the city's current water metering system with a system made by Sensus that is WiFi based and state of the art. In that meeting, we were asked to develop additional information on this project, including:

- 1. A cost benefit analysis that would demonstrate the period of time required to recover our investment in the Sensus meters:
- 2. The cost of returning to manual water meters and a manual meter reading system; and
- 3. Bench testing of the Sensus water meters to test the claims of superior accuracy of measuring water.

Since that time, the number of meters with non-readable electronic measuring units has increased to over 6,000 and the need to move ahead with this project is paramount. Accordingly, barring negative input from the City Council individually or collectively, we plan to move ahead with the project. This includes issuance of an installation RFP to select an installer and presentation of Council agenda items to award the installation contract as well as an agenda item to purchase the Sensus meters.

Recommendation

The recommendation to install Sensus meters citywide is confirmed by the following analysis. The total project cost is now estimated at \$10.2 million, less than the \$11.4 million cost presented at the time of the January 23 meeting. This is because of a negotiated \$1.1 million reduction in prices for the Sensus meters (see cost detail for the Sensus project in Attachment A).

Background

The city has approximately 28,000 water meters manufactured by Neptune and read using "drive-by" meter reading capability. This system, installed beginning in 2002, is failing, with over 6,000 meters with out of service electronic registers spread all over town (see Attachment B). The useful life of the Neptune meters themselves is fifteen years, so replacing the EMU alone is not a cost effective option. At this point, replacing the out of date meters and EMU's citywide is the only cost-effective option. This

memo presents the responses to the three questions posed by City Council on January 23 and a recommendation to implement the meter replacement project using Sensus meters.

Meter Testing

As part of the project, two independent meter testing companies tested 1-inch meters from Sensus and Neptune. Each company was given five new Neptune meters and ten new Sensus meters. Each meter was bench tested on a pressurized closed water system to the American Water Works Association M-6 standards Sensus recommendations. Prior to testing, the line was checked for leaks to ensure accurate results. Upon connecting each meter, the line and the meter were purged to assure that no air or debris were in the line. As noted below, each meter was tested by a flow of water through the meters on the bench into a certified test tank. A reading was taken from each meter and compared to the exact know quantity of water in the test tank. The comparison was used to determine the percent of accuracy of each meter.

AWWA 1-inch C-700 PD Meters

3/4-inch/Gallons per minute at 10 gallons total test 4 Gallons per minute at 10 gallons total test 40 Gallon per minute at 100 gallons total test 5 Gallon per minute at 100 gallons total test

Sensus Recommendations

Flow 100 gallons to purge air 1/10 Gallon per minute at 10 gallons total test 5 Gallon per minute at 100 gallons total test 10 Gallon per minute at 100 gallons total test 35 Gallon per minute at 100 gallons total test

Overall Testing Results (See Attachment C)

Sensus Meters 100.99% Neptune Meters 100.08%

As you can see the difference is minimal, less than 1% between the Sensus and Neptune meters. Therefore, the apparent benefits of using the Sensus meters for purposes of greater accuracy has been eliminated as a factor in the following cost-benefit analysis. However, the fact that the Sensus meters measured approximately 1% more water than actually was used in the test does present us with the need to consider a 1% rate decrease to offset any apparent over billing that might occur.

Detailed results of the testing are part of Attachment C.

Cost-Benefit Methodology

The Utility Billing budget is being allocated according to five activity categories as follows:

- 1. Phone customer service, including contacts with customers over the phone primarily on billing and payment issues.
- 2. Field customer service, including all field contacts and field investigations of conditions reported by customers.
- 3. Connections and disconnections, including calls and field work concerning ongoing efforts to hook up new customers and disconnect service whether for reason of a resident move or disconnection for purposes of delinquent payment.
- 4. System maintenance, including removal, replacement and/or testing of meters for reason of suspected malfunction.
- 5. Meter reading and billing, including field drive-by meter reading, follow up manual reading where meter electronic sending units are not working, as well as loading electronic usage data into the utility billing system.

The results of this allocation provide the basis for estimating the cost impact of each of three alternative approaches to meter reading and replacing necessary meters. Annual totals, including the operating and project cost, are totaled, accumulated, and compared. Annual growth and inflation are a part of the projections as well as a 4% discount rate.





OPINION OF PROBABLE CONSTRUCTION COST FOR AMI NETWORK & METER REPLACEMENT CITY OF LEAGUE CITY, TX PHASE I

March 15, 2012

Item	(Unit	
No.	Description		Unit	Qty.	Price	Total
1.	Bonds & Insurance		L.S.	1	\$22,000	\$22,000
2.	Network Infrastructure (2 TGB's)		L.S.	1	158,079	158,079
					Net	work Subtotal
3	5/8" Sensus iPerl Meters		Ea.	4,223	111	468,753
	5/8" Sensus iPerl Meter Installation		Ea.	4,223	40	168,920
	Single-port Smart Point MXU for 5/8" Replacement Met	ers in Single Box	Ea.	115	114	13,110
	Dual-port Smart Point MXU for 5/8" Replacement Meter		Ea.	2,054	130	267,020
	3/4" Sensus iPerl Meters	TO III DUUI DOX	Ea.	4	111	444
	3/4" Sensus iPerl Meter Installation		Ea.	4	40	160
	Single-port Smart Point MXU for 3/4" Replacement Met	ere	Ea.	4	114	456
	1" Sensus iPerl Meters	1013	Ea.	9,814	152	1,491,728
	Single-port Smart Point MXU for 1" Replacement Meter	re	Ea.	9,814	114	
	1" Sensus iPerl Meter Installation	3	Ea.	9,814	40	1,118,796 392,560
12.	Toerisus ir ett meter mistaliation		La.	9,014	*******	Jeter Subtotal
					Small	neter Subtotal
13.	1.5" Omni T2 Meters		Ea.	97	539	52,272
14.	Single-port Smart Point MXU for 1.5" Replacement Met	ers	Ea.	97	114	11,058
	1.5" Meter Installation		Ea.	97	105	10,185
16.	2" Omni C2 Meters		Ea.	370	909	336,289
17.	Single-port Smart Point MXU for 2" Replacement Meter	rs	Ea.	370	114	42,180
18.	2" Meter Installation		Ea.	370	166	61,420
19.	3" Omni C2 Meters		Ea.	16	1,151	18,416
20.	Single-port Smart Point MXU for 3" Replacement Meter	rs	Ea.	16	114	1,824
	3" Meter Installation		Ea.	16	345	5,520
22.	4" Omni C2 Meters		Ea.	17	2.000	34,000
23.	Single-port Smart Point MXU for 4" Replacement Meter	rs	Ea.	17	114	1,938
24.	4" Meter Installation		Ea.	17	465	7,905
25.	6" Omni C2 Meters		Ea.	35	3,454	120,890
26.	Single-port Smart Point MXU for 6" Replacement Meter	rs	Ea.	35	114	3,990
	6" Meter Installation		Ea.	35	650	22,750
28.	8" Omni C2 Meters		Ea.	8	5,580	44,640
	Single-port Smart Point MXU for 8" Replacement Meter	rs	Ea.	8	114	912
	8" Meter Installation		Ea.	8	1,000	8,000
				87	LOVALES SATES	Meter Subtotal
31.	Yoke Replacement/Fittings (25% of 1" Meters)		Ea.	2,500	75	187,500
		CUIDTOTAL				05.071.000
	This Document is Released for the Purpose of: Review & Discussion	SUBTOTAL	/400/ \			\$5,074,000
	Under the Authority of:	Contingencies	(10%)		-	507,000
	Engineer: Richard Golden, P.E. License No.: 90143	TOTAL				\$5,581,000
	It is Preliminary in Nature and not to be Used for					
	Feasibilty of Land Purchases, Bond Applications, Loans or Grants.					

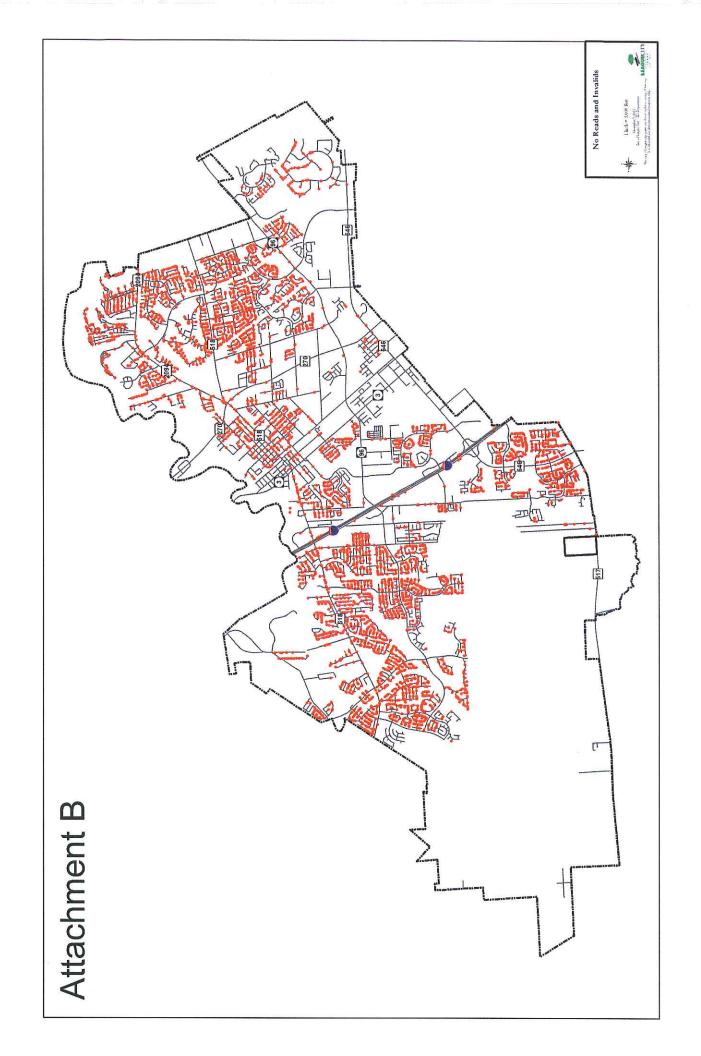


OPINION OF PROBABLE CONSTRUCTION COST FOR AMI NETWORK & METER REPLACEMENT CITY OF LEAGUE CITY, TX

PHASE II

March 15, 2012

Description Unit Qty Price Total	Item					Unit	
1. Bonds & Insurance	No.		l	Unit	Qtv.		Total
4. 5/8" Sensus iPerl Meter Installation 5. Single-port Smart Point MXU for 5/8" Replacement Meters in Single Box 6. Dual-port Smart Point MXU for 5/8" Replacement Meters in Dual Box 7. 3/4" Sensus iPerl Meters 8. 1,237 130 160,810 7. 3/4" Sensus iPerl Meters 8. 1,237 130 160,810 7. 3/4" Sensus iPerl Meters 8. 3 111 333 8. 3/4" Sensus iPerl Meter Installation 9. Single-port Smart Point MXU for 3/4" Replacement Meters 8. 3 114 342 9. Single-port Smart Point MXU for 3/4" Replacement Meters 8. 9,464 152 1,438,528 11. Single-port Smart Point MXU for 1" Replacement Meters 8. 9,464 114 1,078,896 12. 1" Sensus iPerl Meter Installation 8. 9,464 114 1,078,896 12. 1" Sensus iPerl Meter Installation 8. 9,464 114 1,078,896 12. 1" Sensus iPerl Meter Installation 8. 9,464 114 1,078,896 13. 1.5" Omni T2 Meters 14. Single-port Smart Point MXU for 1.5" Replacement Meters 8. 37 539 19,939 14. Single-port Smart Point MXU for 1.5" Replacement Meters 8. 37 114 4,218 15. 1.5" Meter Installation 8. 37 105 3,885 16. 2" Omni C2 Meters 8. 1. 158 909 143,805 17. Single-port Smart Point MXU for 2" Replacement Meters 8. 1. 158 114 18,012 18. 2" Meter Installation 8. 2. 158 166 26,228 19. 3" Omni C2 Meters 8. 2. 1,151 2,302 20. Single-port Smart Point MXU for 3" Replacement Meters 8. 2. 114 228 21. 3" Meter Installation 8. 2. 2 345 690 22. 4" Omni C2 Meters 8. 2. 4 114 456 24. 4" Meter Installation 8. 2. 4 2,000 8,000 23. Single-port Smart Point MXU for 4" Replacement Meters 8. 2. 4 114 456 24. 4" Meter Installation 8. 2. 4 4 65 1,860 25. 6" Omni C2 Meters 8. 6 650 3,900 26. 8" Omni C2 Meters 8. 6 650 3,900 27. 6" Meter Installation 8. 6 650 3,900 28. 8" Omni C2 Meters 8. 6 650 3,900 29. Single-port Smart Point MXU for 6" Replacement Meters 8. 6 650 3,900 00. 8" Meter Installation 8. 6 650 3,900 00. 8" Meter Installation 9. 8" Meter Installation	1.				70		
4. 5/8" Sensus iPerl Meter Installation 5. Single-port Smart Point MXU for 5/8" Replacement Meters in Single Box 6. Dual-port Smart Point MXU for 5/8" Replacement Meters in Dual Box 7. 3/4" Sensus iPerl Meters 8. 1,237 130 160,810 7. 3/4" Sensus iPerl Meters 8. 1,237 130 160,810 7. 3/4" Sensus iPerl Meters 8. 3 111 333 8. 3/4" Sensus iPerl Meter Installation 9. Single-port Smart Point MXU for 3/4" Replacement Meters 8. 3 114 342 9. Single-port Smart Point MXU for 3/4" Replacement Meters 8. 9,464 152 1,438,528 11. Single-port Smart Point MXU for 1" Replacement Meters 8. 9,464 114 1,078,896 12. 1" Sensus iPerl Meter Installation 8. 9,464 114 1,078,896 12. 1" Sensus iPerl Meter Installation 8. 9,464 114 1,078,896 12. 1" Sensus iPerl Meter Installation 8. 9,464 114 1,078,896 13. 1.5" Omni T2 Meters 14. Single-port Smart Point MXU for 1.5" Replacement Meters 8. 37 539 19,939 14. Single-port Smart Point MXU for 1.5" Replacement Meters 8. 37 114 4,218 15. 1.5" Meter Installation 8. 37 105 3,885 16. 2" Omni C2 Meters 8. 1. 158 909 143,805 17. Single-port Smart Point MXU for 2" Replacement Meters 8. 1. 158 114 18,012 18. 2" Meter Installation 8. 2. 158 166 26,228 19. 3" Omni C2 Meters 8. 2. 1,151 2,302 20. Single-port Smart Point MXU for 3" Replacement Meters 8. 2. 114 228 21. 3" Meter Installation 8. 2. 2 345 690 22. 4" Omni C2 Meters 8. 2. 4 114 456 24. 4" Meter Installation 8. 2. 4 2,000 8,000 23. Single-port Smart Point MXU for 4" Replacement Meters 8. 2. 4 114 456 24. 4" Meter Installation 8. 2. 4 4 65 1,860 25. 6" Omni C2 Meters 8. 6 650 3,900 26. 8" Omni C2 Meters 8. 6 650 3,900 27. 6" Meter Installation 8. 6 650 3,900 28. 8" Omni C2 Meters 8. 6 650 3,900 29. Single-port Smart Point MXU for 6" Replacement Meters 8. 6 650 3,900 00. 8" Meter Installation 8. 6 650 3,900 00. 8" Meter Installation 9. 8" Meter Installation	3.	5/8" Sensus iPerl Meters		Fa	3.610	111	400 710
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14. Single-port Smart Point MXU for 1.5" Replacement Meters					0,101		
14. Single-port Smart Point MXU for 1.5" Replacement Meters	13.	1.5" Omni T2 Meters		Fa	37	539	19 939
15. 1.5" Meter Installation Ea. 37 105 3,885 16. 2" Omni C2 Meters Ea. 158 909 143,605 17. Single-port Smart Point MXU for 2" Replacement Meters Ea. 158 114 18,012 18. 2" Meter Installation Ea. 158 166 26,228 19. 3" Omni C2 Meters Ea. 2 1,151 2,302 20. Single-port Smart Point MXU for 3" Replacement Meters Ea. 2 114 228 21. 3" Meter Installation Ea. 2 345 690 22. 4" Omni C2 Meters Ea. 4 2,000 8,000 23. Single-port Smart Point MXU for 4" Replacement Meters Ea. 4 114 456 25. 6" Omni C2 Meters Ea. 4 465 1,860 25. 6" Omni C2 Meters Ea. 6 3,454 20,724 26. Single-port Smart Point MXU for 6" Replacement Meters Ea. 6 3,454 20,724 26. Single-port Smart Point MXU for 6" Replacement Meters Ea. 6 650 3,900 28. 8" Omni C2 Meters Ea. 7 5,580 0 29. Single-port Smart Point MXU for 8" Replacement Meters Ea 114 0 30. 8" Meter Installation Ea 1,000 0 Large Meter Subtotal							and the same of th
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27. 6" Meter Installation Ea. 6 650 3,900 28. 8" Omni C2 Meters Ea. - 5,580 0 29. Single-port Smart Point MXU for 8" Replacement Meters Ea. - 114 0 30. 8" Meter Installation Ea. - 1,000 0 Large Meter Subtotal							
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Large Meter Subtotal				(1) F2.4		18 7,281	0 <u>=</u> 0
31 Yoke Replacement/Fittings (25% of 1" Meters) 52 2 500 75 467 500				Lu.		C. C	
61. Toke replacement langs (20% of 1 Meters) Ea. 2,500 /5 <u>187,500</u>	31.	Yoke Replacement/Fittings (25% of 1" Meters)		Ea.	2,500	75	187,500
75 Ea. 2,500	28. 29. 30.	8" Omni C2 Meters Single-port Smart Point MXU for 8" Replacement Meters 8" Meter Installation		Ea. Ea. Ea.	# F	5,580 114 1,000 Large	M
		Review & Discussion		400/			\$4,207,000
Review & Discussion SUBTOTAL \$4,207,000		Frances Pichard Golden DF	T	10%)		_	and the second s
Review & Discussion Under the Authority of Engineer Eight Golden P.F. Contingencies (10%) 421,000		License No.: 90143 It is Preliminary in Nature and not to be Used for Feasibilty of Land Furchases, Bond Applications, Loans or Grants.	TOTAL				\$4,628,000



TESTING COMPANY	METER TYPE	METER NUMBER	TESTING AVERAGE	OVERALL AVERAGE
Accurate Meter	Sensus	73099617	99.63%	****
Accurate Meter	Sensus	73099634	99.68%	
Accurate Meter	Sensus	73099605	99.88%	
Accurate Meter	Sensus	73099616	99.73%	
Accurate Meter	Sensus	73099627	99.80%	
Accurate Meter	Sensus	73099635	99.80%	
Accurate Meter	Sensus	73099610	99.73%	
Accurate Meter	Sensus	73099613	99.75%	
Accurate Meter	Sensus	73099631	99.75%	
Accurate Meter	Sensus	73099611	100.15%	99.79%
Fluid Meter	Sensus	73099609	101.04%	l
Fluid Meter	Sensus	73099603	100.87%	
Fluid Meter	Sensus	73099602	101.07%	
Fluid Meter	Sensus	73099604		
Fluid Meter	Sensus	73099607	100.83%	
Fluid Meter	Sensus	73099606	101.07%	
Fluid Meter	Sensus	73099633	101.47%	
Fluid Meter	Sensus	73099626	101.23%	
Fluid Meter	Sensus	73099632	100.75%	
Fluid Meter	Sensus	73099630	100.79%	101.03%
Accurate Meter	Neptune	52390396	100.17%	1
Accurate Meter	Neptune	52390390	100.17%	
Accurate Meter	Neptune	52390397	100.17%	
Accurate Meter	Neptune	52390398	100.27%	
Accurate Meter	Neptune	52390390	99.83%	100.17%
Accurate Weter	Neptune	32390391	33.03/0	100.17/8
Fluid Meter	Neptune	52390414	99.99%	
Fluid Meter	Neptune	52390415	99.61%	
Fluid Meter	Neptune	52390416	99.62%	
Fluid Meter	Neptune	52390392	100.65%	
Fluid Meter	Neptune	52390352	99.84%	99.94%

ATTACHMENT D

UTILITY FUND EXPENDITURE SUMMARY MANAGEMENT SERVICES DIRECTORATE UTILITY BILLING

#REF

				Field Customer	Connections		Meter	Phone Customer	Field Customer	Connections/	System	Meter	
NUMBER ACCOUNT	ACCOUNT DESCRIPTION	Adopted	Service		Disconnetes	Maintenance	Reading/Billing	Service Service	Service	Disconnetes	Maintenance	Reading/Billing	
Personnel Services SALARIES													
Utility Billing Manager	nager	54,788	22,463	4,383	1,644	2,739	23,559	41%	8%	3%	2%	43%	
Utility Account Representative	epresentative	36,331	16,349	727	727	727	17,802	45%	2%	5 %	2%	49%	
Utility Account Representative	epresentative	48,0/4	22,083	- 586 - 586	98	981	24,046	45%	%2	8 %	2%	49%	
Utility Account Representative	spresentative	33,571	16,107	671	671	671	16,450	45%	2%	2%	2%	49%	
Accounts Receivable Clerk	able Clerk	24,794	24,794		a		1	100%					
Accounts Receivable Clerk	able Clerk	34,264	34,264	5)))	6 9	(@)	f% - i	100%					
Customer Service Technician	able Clerk	27.416	600,02	6.854	2 742	4 112	13 708	%%	25%	10%	15%	20%	
Customer Service Technician	9 Technician	23,895	1 16	5,974	2,389	3,584	11,947	%0	25%	10%	15%	909	
Customer Service Technician	e Technician	26,364	ē	6,591	2,636	3,955	13,182	%0	25%	10%	15%	9609	
Customer Service Technician	a Technician	24,373	ï	6,093	2,437	3,656	12,186	%0	25%	10%	15%	9609	
Lead Customer Service Tech	service Tech	30,519	1	7,630	3,052	4,578	15,259	%0	25%	10%	15%	9099	
		34,113	34,113			,	1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	400%	à	č	702	2007	
5002 TOTAL Salaries		474,220	217,430	40,866	18,241	25,965	47,777 (0)409	%14 %044	9,60	% of	070	1036	
5004 Vacancy Savings		(41,510)	(810'0)	(17/1)	(0#0)	(070'1)	(8,2,8)	41%	8 %	%E	2%	43%	
		2.400	984	192	72	120	1,032	41%	968	3%	2%	43%	
	ısation				٠			41%	968	3%	2%	43%	
		64,820	26,576	5,186	1,945	3,241	27,873	41%	8%	3%	9%9	43%	
5015 Longevity		10,700	4,387	856	321	535	4,601	41%	8%	3%	2%	43%	
5016 FICA taxes		38,030	15,592	3,042	1,141	1,902	16,353	41%	968	3%	9%9	43%	
	псе	87,700	35,957	7,016	2,631	4,385	37,711	41%	8%	3%	2%	43%	
	ince	1,800	738	144	54	06	774	41%	8%	3%	2%	43%	
5025 Dependent Insurance	ance	24,800	10,168	1,984	744	1,240	10,664	41%	% G	36%	2%	43%	
Total Personnel Services	1 1	\$ 690,960	306,293	\$ 58,205	\$ 24,744	\$ 36,802	\$ 264,914	2	80	800	860	2	
	U												
Supplies 5101 Office Supplies		5.000	2.050	400	150	250	2.150	41%	968	3%	2%	43%	
		COMPAND TO	U.	100	1	40	1	41%	8%	3%	2%	43%	
	perating Supplies	1,500	615	120	45	75	645	41%	9%8	3%	5%	43%	
		75,000	•	4,000	126,000	125 000	9,000	0%	2076	%05	50%	200	
5158 Water Meters 5169 Water Meter Parts and Supplies	s and Sunnline	75,000			000,621	75,000				8.00	100%		
	Computer Equipment and Software	200	210	65	30	45	150	42%	13%	%9	%6	30%	
Total Supplies		\$ 348,000 \$	2,875	\$ 4,585	\$ 126,825	\$ 202,770	\$ 10,945						
Repairs and Maintenance													
	und Maintenance				,				i i	, ,	,020	1000	
5230 Vehicle Maintenance 5240 Equipment Repair an	Vehicle Maintenance Equipment Repair and Maintenance	22,400	4 39	5,600	2,240	3,360	13,833	%6 6	25%	10%	15%	50%	
	Repair & Maint.					0.000.000.000							
Total Repairs and Maintenance		\$ 50,065 \$	A.	\$ 12,516	\$ 5,007	\$ 7,510	\$ 25,033						
5305 Professional Services	ices	130,100		32,525	13,010	19,515	65,050	%0	25%	10%	15%	%05	
	Dues	400		100	40	9	200	%0	25%	10%	15%	20%	
	ght	134,000	30	1	i)	n i	134,000					100%	
5312 Banking Fees	S	16,000				i 1	16,000					100%	
	n	2,000	E 15	200	200	300	1,000	%0	25%	10%	15%	20%	
5327 Motor Pool Lease Fees	Fees	14,600	,	3,650	1,460	2,190	7,300	%0	25%	10%	15%	50%	
	ng Telephone	4,420	3	200	74.7	999	017.	80	200				
ryic		\$ 439,520 \$		\$ 37,380	\$ 14,952	\$ 22,428	\$ 364,760						
Special Programs and Events	350-1												
5418 Public Awareness Total Special Programs and Events	Events	12,000 \$	9,000	6,000	1 1		, , ,	20%	9609				
O Topics													
Total Capital Outlay	1*1	\$		s		s	1						
Transfers	12												
Total Transfers To:	17]	\$.	20										
Debt Service Total Debt Service	171			x			50						
Total Expenses	11	\$ 1,540,545 \$	315,168	\$ 118,686	\$ 171,528	\$ 269,510	\$ 665,652						
	В					I							

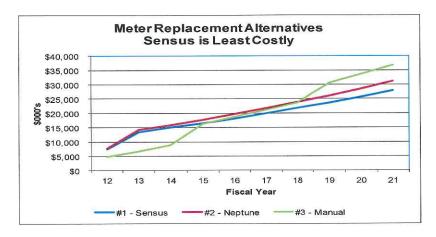
Alternatives and Costs (See Attachment E)

Three alternatives are discussed here. A fourth option, taking no action, is not discussed here because it is not an option. The number of out of service meters is now in excess of 6,000, and action is required. The project will be conducted beginning in FY 2012 and ending in FY 2013.

- 1. Full implementation of the Sensus alternative with WiFi capability. This alternative includes replacement of every existing water meter and placement of a WiFi receiving unit on each of two of the City's water towers. One-time project cost: \$10.2 million. Ten year operating and project cost: \$23.5 million.
 - Cost Impact of Alternative #1: Drive-by meter reading will be eliminated, along with loading of meter reading data into the utility billing system (\$200,000 savings annually). Also some benefits will be realized in reducing field personnel's work in system maintenance and field customer service, based on ready availability of information on individual accounts accessible through the system. Also, contract field technicians would be eliminated entirely.
- 2. Replacement of water meters out of service with Neptune meters. This option retains the drive by meter reading approach because the Neptune WiFi system is not feasible to use at this time. By Neptune's own propagation study, fifteen receivers would be needed citywide to utilize Neptune's WiFi system. One-time project Cost: \$11.8 million. Ten year operating and project cost: \$27.7 million.
 - Cost Impact of Alternative #2: Savings would be available immediately through elimination of the contract field technicians. A slight increase in System Maintenance costs would be realized as Neptune units currently failing at a steady rate would be replaced instead of being manually read.
- 3. **Reverting to manually read system:** This entails installing manually read registers in all meters. Project Cost: \$11.3 million spread over eight years. Ten year operating and project cost: \$29.7 million.
 - Cost Impact of Alternative #3: The cost of reading meters would increase by 25% (\$160,000) to provide sufficient personnel to manually read 28,000 meters. The manually read registers would cost less to convert to this option in the near term would require replacement of all meters by 2020 at the end of their useful life. (Note; Two replacement phases are shown in the cash flow analysis, 2016 and 2020.) The cost of phone customer service (10% increase or \$30,000) and fiel customer service (10% increase or \$12,000) would also occur due to an increase in human error in the reading and reporting process.

Results and Recommendation

Alternative #1, Sensus is the most cost effective solution for the City.



The Sensus alternative is less expensive than the Neptune alternative, saving \$525,000 in year one, and a cumulative savings of \$4.2 million over a ten year period. Sensus begins to pay for itself compared with the manual read system in year five of the ten year analysis. For the entire ten year period, Sensus is \$6.2 million less than the manual read option.

In addition Sensus provides the following benefits to the City compared with the other alternatives:

- Lowest cost "full featured" option;
- Only two receivers required will use existing water towers;
- Sensus delivers the highest power, FCC-Licensed primary-use communications system
- No moving meter reading parts. Sensus utilizes a flow tube.
- · Warranty applicable to both meter and register as one unit
- Works with existing cast iron meter boxes
- "On-Demand" meter reading
- Can be read by drive-by if WiFi is down

Please let me know if you need further information on this matter.

Michael W. Loftin

Acting City Manager

Attachments

ATTACHMENT E COST BENEFIT ANALYSIS WATER METER INSTALLATION PROJECT THREE ALTERNATIVES

						(\$20,000)	(\$20,000)	(\$20,000)			Field Customer Service - Should drop to half over three
									(\$15,000)		System Maintenance - Reduction of field personnel's system maintenance work (\$15,000); Net adjustment of software Maintenance of software (\$10K Neptune less \$6K Sensus) is included.
								(\$100,000)	(\$100,000)		Effect on meter reading and billing - Eliminate drive by, and data loading exercise as well as contract workers
											No meter replacement costs - All meters under warranty
3.0%	3.0	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	2.5%	2.0%		Annual growth rates - Affect all categories
	3	200									Sensus Assumptions
10) (\$6,181,773)	(\$5,569,510)	(\$4,966,269)	(\$1,283,955)	(\$698,363)	(\$121,512)	\$446,933	\$5,495,150	\$6,027,925	\$2,254,904		Over/(Under) Manual Read Option
	(\$3,908,656)	(\$3,649,894)	T	(\$3,143,578)	(\$2,896,130)	(\$2,652,265)	(\$2,412,065)	(\$2,194,083)	(\$524,519)		Over/(Under) Neptune Continuation
	\$22,077,443	\$20,637,000		\$17,819,470	\$16,442,347	\$15,085,510	\$13,749,365	\$12,414,715	\$6,801,827	4%	Net Present Value - Discount Rate
	\$25,435,100	\$23,384,900	\$21,442,100	\$19,602,500	\$17,860,000	\$16,209,200	\$14,646,100	\$13,144,800	\$7,073,900		CUMULATIVE COST
92,164,200	\$2,050,200	\$1,942,800	\$1,839,600	\$1,742,500	\$1,650,800	$\overline{}$	\$1,501,300	\$6,070,900	\$7,073,900		ANNUAL COSTS
-	46	\$0	\$0	\$0	\$0			\$4,62	\$5,581,000		Inflated Meter Replacement
1.219	1.189	1.160	_	1.104		1.051	1.025		1.000	1.000	CPI Adjustment
								\$4,628,000	\$5,581,000		Meter Replacement
									3	.,,	CARTAL COSTS
2	2,050,200	1,942,800		1,742,500	1,650,800	_	1.501.300	_	1 492 900	1 540 544	TOTAL AD ILISTED OBEDATING COSTS WITH CDI
00 800,300	758,100	718,400	680,200	644,300	6	5	547,400	51	593,500	665.652	Adjusted Meter Reading wh CPI
1.280	1.249	1.219		1.160		1.104	1.077		1.025	1.000	CPI Adjustment
000 625,200	607,000	589,300	572,100	555,400	539,200	523,50	508,300	493,500	579,000	665.652	Adjusted Meter Reading
0		0	0	0			0	(100	(100.000)		
	3.0%			3.0%			3.0%		2.0%	000,000	Weter Reading
	589,300		555,400	539,200	523,500		493,500			665 652	
43	409,200	387,800	3(347,800	w	ų	295.500	28	266 400	269 510	Adjusted System Maintenance wh CDI
	1.249	1.219						1 051		1 000	Adjusted System Maintenance
00 337,400	327,600	318.100	308.80	299 800	291 100	282 600	274 400	288 400	(15,000)	200 540	Program savings
	3.0%	3.0%	3.0%	3.0		3.0	3.0	2.5%	2.0%		Growth Adjustment
300/	316,100	308,800	299,800	29		27	26	259,900	269,510	269,510	System Maintenance
	275,500	261,100	247,300		221,900		199,000		179,400	171,528	Adjusted Connections/ Disconnects wh CPI
	1.249	1.219			1.132		1.077		1.025	1.000	CPI Adjustment
22	220,600	214,200	208,000	20		19	184,800	17	175.000	171 528	Adjusted Corrections/ Disconnects
	3.0%	3.0%	3.0%	3.0%		3.0%	3.0%	2 500	%0.0 C	777,528	Connections/ Disconnects
00 220,600	214 200	208,000	201,000				93,900	109,400	124,100	118,686	Adjusted Field Customer Service wh CPI
	1.249	617.L	1.189				1.077	1.051	1.025	1.000	CPI Adjustment
	81,000	78,600	76,300	74,100			87,200	104,100	121,100	118,686	Adjusted Field Customer Service
						(20,000)	(20,000)	(20,000)			
3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%		2.0%		Growth Adjustment
00	78,600	76,300	74,100	71,900		87,200	104,100		118,686	118,686	Field Customer Service
C)	506,200	479,700	454,200	430,200	407,600	386,000	365,500	ယ္	329,500	315,168	Adjusted Phone Customer Service wh CPI
	1.249	1.219	1.189	1.160	1.132	1.104	1.077	1.051	1.025	1.000	CPI Adjustment
4.	405,300	393,500	382,000	37	360,100	349,600	339,400	32	321,500	315.168	Adjusted Phone Customer Service
	3.0%	3.0%	3.0%	3.0%	3.0%		3.0%		2.0%	010,100	Priorie Customer Service
00 405,300	393,500	382,000	370,900	360,100	349,600	339,400	329.500	321 500	315 168	315 168	OPERATING COSTS
FY2022	FY2021	FY2020	FY2019	FY2018	FY2017	FY2016	FY2015	FY2014	FY2013	FY2012	SENSUS OPTION
_											

ATTACHMENT E COST BENEFIT ANALYSIS WATER METER INSTALLATION PROJECT THREE ALTERNATIVES

MUDDLE THROUGH WITH NEPTUNE	T12012	- 14010									
OPERATING COSTS		1			220 400	240 600	360 100	370 000	382 000	393 500	405 300
Phone Customer Service	315,168	315,168	321,500	329,500	339,400	349,000	300,100	3.0%	3.0%	3.0%	3.0%
Growth Adjustment	045 400	224 500	220 500	330 400	349 600	360 100	370 900	382,000	393.500	405,300	417,500
Adjusted Phone Customer Service	315,168	1 025	1 051	1 077	1 104	1.132	1.160	1.189	1.219	1.249	1.280
Adjusted Phone Customer Service wh CPI	315 168	329.500	346.300	365.500	386,000	407,600	430,200	454,200	479,700	506,200	534,400
Field Customer Service	118.686	118.686	121,100	124,100	127,800	131,600	135,500	139,600	143,800	148,100	152,500
Growth Adjustment		2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Adjusted Field Customer Service	118,686	121,100	124,100	127,800	131,600	135,500	139,600	143,800	148,100	152,500	157,100
CPI Adjustment	1,000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219	1.249	1.280
Adjusted Field Customer Service wh CPI	118,686	124,100	130,400	137,600	145,300	153,400	161,900	171,000	180,500	190,500	201,100
Connections/ Disconnects	171,528	171,528	175,000	179,400	184,800	190,300	196,000	201,900	208,000	214,200	220,600
Growth Adjustment		2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Adjusted Connections/ Disconnects	171,528	175,000	179,400	184,800	190,300	196,000	201,900	208,000	214,200	220,600	227,200
CPI Adjustment	1.000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219	1.249	1.280
Adjusted Connections/ Disconnects wh CPI	171,528	179,400	188,500	199,000	210,100	221,900	234,200	247,300	261,100	275,500	290,800
System Maintenance	269,510	269,510	290,200	312,800	322,200	331,900	341,900	352,200	362,800	3/3,/00	384,900
Growth Adjustment		2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	306 400
Adjusted System Maintenance	269,510	290,200	312,800	322,200	331,900	341,900	352,200	362,600	1 219	1 249	1 280
CPI Adjustment	1.000	1.025	1.051	770.1	366 400	387 000	408 600	431 400	455 500	480.700	507.400
Adjusted System Maintenance wh CPI	269,510	297,300	645 800	628 600	647 500	666,900	686,900	707,500	728,700	750,600	773,100
Weter Reading	000,000	2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Adjusted Meter Reading	665,652	645,800	628,600	647,500	666,900	686,900	707,500	728,700	750,600	773,100	796,300
CPI Adjustment	1,000	1.025	1.051	1.077	1.104	1.132	1.160	1.189	1.219	1.249	1.280
Adjusted Meter Reading wh CPI	665,652	661,900	660,700	697,400	736,300	777,600	820,700	866,400	915,000	965,600	1,019,300
TOTAL ADJUSTED OPERATING COSTS WITH CPI	1,540,544	1,592,400	1,654,700	1,746,500	1,844,100	1,947,500	2,055,600	2,170,300	2,291,800	2,418,500	2,553,000
CAPITAL COSTS											
Meter Replacement		\$5,880,000	\$5,920,000	2		4 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	4 460	1 100	1 210	1 240	1 280
	1.000	1.025	1.051	1.0//	7.104	1.132		1.108		60	9
Inflated Meter Replacement		\$6,027,000	\$6,222,000	\$0	\$0	90	\$0000	2000	2000	43 440 500	#3 ##3 DOD
ANNUAL COSTS		\$7,619,400	\$7,876,700	\$1,746,500	\$1,844,100	\$1,947,500	\$2,055,600	\$2,770,300		\$2,410,500	\$2,000,000
CUMULATIVE COST		\$7,619,400	\$15,496,100	\$17,242,600	\$19,086,700	\$21,034,200	\$23,089,800	\$25,260,100			\$37,323,400
Net Present Value - Discount Rate	4%	\$7,326,346	\$14,608,798	\$16,161,430	\$17,737,775	\$19,338,478	\$20,963,048	\$22,612,298	\$24,286,894	\$25,986,700	\$27,710,610
Baseline Assumptions										000	3
Annual growth rates - Affect all categories		2.0%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Meter replacement schedule											
Meter Replacement is staggered over two years.											
Effect on meter reading and billing - Immediate replacement											
of meters with registers out of order reduces meter reading		(32,500)	(32,500)								
System Maintenance - This cost would increase to account			45 000								
for replacing new Neptune units that are falling but are now being read manually		19,000	10,000								

CONVERT BACK TO MANUALLY READ METERS FROM NEPTUNE

FY2012

FY2013

FY2014

FY2015

FY2016

FY2017

FY2018

FY2019

FY2020

FY2021

FY2022

OPERATING COSTS

Manual Reading

ATTACHMENT E COST BENEFIT ANALYSIS WATER METER INSTALLATION PROJECT THREE ALTERNATIVES

143,000	946,100 974,500 1,132 1,160 1,071,000 1,130,400 2,342,400 2,472,400 \$0 1,132 1,160 \$0 \$0 1,132 \$0 1,132 1,160 \$0 1,160 \$0 \$2,342,400 \$2,472,400 \$18,630,600 \$21,103,000 \$18,630,63,859 \$18,517,833 3,0% 3,0% 3,0%	1.077 960,400 2,100,600 30 \$0 \$1.0077 \$0 \$2,100,600 \$2,100,600 \$8,819,400 \$1,254,216 \$3,254,216 \$3,254,216 \$3,0%	5 1.051 909,900 91,990,000 1,990,000 5 1.051 \$1,990,000 \$6,718,800 \$6,386,790	\$3,04 \$3,11 \$3,47 \$4,72 \$4,54	1,540,544 1,540,544 1.000 4%	Meter Replacement CAPITAL COSTS Meter Replacement Inflated Meter Replacement CPI Adjustment Inflated Meter Replacement ANNUAL COSTS CUMULATIVE COSTS CUMULATIVE COSTS CUMULATIVE COSTS Annual growth rates - Affect all categories Meter conversion - Replace electronic registers with manual read registers for all meters, then go to replacement of meters in 2016 and 2020 Increase current meter reading and billing cost by 25% to include manual reading (two meter technicians) for all accounts (see growth factor in FY14) Increase system maintenance cost by 25% to include manual reading (two meter technicians) for all accounts (see growth factor in FY14)
3.0% 167,500 167,500 167,500 167,500 167,500 162,600 162,600 162,600 162,600 17,140 1.132 1.160 1.189 1.219 1.249 1	946,100 974,500 1,132 1,130,400 1,071,000 1,130,400 2,342,400 2,472,400 \$0 \$0 1.160 1,132 1.160 \$0 \$0 1.160 \$0 \$1.132 1.160 \$0 \$2,342,400 \$2,472,400 \$18,630,600 \$2,472,400 \$18,630,600 \$21,103,000 \$18,563,859 \$18,517,833 \$16,563,859 \$18,517,833	\$0,400 2,100,600 2,100,600 \$0 \$0 \$1,007 \$0 \$1,007 \$0 \$2,100,600 \$2,100,600 \$8,819,400 \$1,254,216 \$3,254,216 \$1,007 \$3,007 \$3,007 \$3,007 \$3,007 \$3,007 \$4,007 \$4,007 \$4,007 \$4,007 \$4,007 \$4,007 \$4,007 \$4,007 \$4,007 \$4,007 \$4,007 \$4,007 \$4,007 \$4,007 \$6,0	1,991 5,55 5,718 56,388	\$3,04 \$3,11 \$4,72 \$4,72	1,540,544 1,000 1,000 4%	Net Pr Net Pr Affect al splace el splace el neters, the 220 220 r reading g (two n
3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 140,300 141,5	946,100 974,500 1,132 1,160 1,071,000 1,130,400 2,342,400 2,472,400 \$0 \$0 1,132 \$0 \$0 \$0 1,132 \$0 1,160 \$0 1,132 \$0 1,160 \$0 \$1,160 \$2,472,400 \$18,630,600 \$2,472,400 \$18,630,600 \$21,103,000 \$18,630,600 \$11,517,833 \$16,563,859 \$18,517,833	1.077 960,400 2,100,600 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0	90, 1,99, 5,718 \$6,386 \$6,386	\$3,04 \$3,04 \$3,11 \$3,71 \$4,72 \$4,72	1,540,544 1,000 1,000	Net Pr Net Pr Affect al splace el neters, th
1,00,000	946,100 974,500 1,132 1,130,400 1,071,000 1,130,400 2,342,400 2,472,400 \$0 \$0 1.132 \$0 \$0 1.160 \$0 \$1.132 1.160 \$0 \$1.132 1.160 \$0 \$2,342,400 \$2,472,400 \$18,630,600 \$2,472,400 \$18,630,600 \$2,472,400 \$18,630,600 \$2,472,400 \$18,630,600 \$2,472,400 \$18,630,600 \$2,472,400 \$18,630,600 \$2,472,400 \$18,630,600 \$2,472,400 \$18,630,600 \$2,472,400 \$18,630,600 \$2,472,400	1.077 960,400 1 2,100,600 \$0 \$0 \$0 \$- 1.077 \$0 \$- 1.077 \$0 \$- \$2,100,600 \$2,2100,600 \$2,2100,600 \$3,819,400 \$1,819,400 \$1,819,400 \$1,819,400 \$1,819,400 \$1,819,400 \$1,819,400	90 1,99 3,1,990 \$1,990 \$6,718 \$6,386	1,6: 1,6: \$3,04 \$3,11 \$4,72 \$4,72 \$4,72	665,652 1,540,544 1.000 1.000	Net Pr
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3.0% 1.7500 167,500 17 1.04 1.132 1.189 1.219 1.249 17 1.07 1.129 1.249 1249 1249 1249 1249 1249 1249 1249 1249 1249 1249 1249 1249 1249 1249 1249 1249 1249 220,500 2214,200 220,200 220,200 220,200 220,200 220,200 220,200 220,200 220,200 220,200 220,500 221,4200 220,500 221,4200 220,500 221,4200 220,500 221,4200 221,4200 222,4500 221,1400 221,4200 221,4200 221,4200 221,4200 221,4200 221,4200 221,4200 221,4200 221,4200	946,100 974,500 1,132 1,160 1,071,000 1,130,400 0 2,342,400 2,472,400 \$0 \$0	1.077 960,400 2,100,600 \$0 \$-	1000	1,6 33,04	1,540,544	TOTAL ADJUSTED OPERATING COSTS WITH CPI CAPITAL COSTS Meter Replacement
3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 1.59,000 167,500 167,500 1	946,100 974,500 1.132 1.160 1,071,000 1,130,400 2,342,400 2,472,400	1.077 960,400 2,100,600		1,6	665,652 1,540,544	TOTAL ADJUSTED OPERATING COSTS WITH CPI
3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 140,300 144,500 148,800 157,900 162,600 167,500 1 1,077 1,104 1,132 1,160 1,189 1,249 1,249 151,100 159,500 168,400 177,800 187,700 198,200 209,200 179,400 184,800 190,300 196,000 201,900 208,000 214,200 2 3,0% <	946,100 974,500 1.132 1.160 1,071,000 1,130,400 2,342,400 2,472,400	960,400 2400 600		4 66	665,652	TOTAL OF THE PARTY
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3.0% 1.55,500 1 67,500 1 167,500 1 1.249 <th< td=""><td>433,600 4</td><td>3</td><td>3</td><td>28</td><td>269,510</td><td>Adjusted System Maintenance wh CPI</td></th<>	433,600 4	3	3	28	269,510	Adjusted System Maintenance wh CPI
3.0% 162,600 167,500 1 1.7500 1 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 2.242,000 2	1.132				1.000	Adjusted System Mailitenance CPI Adjustment
3.0% 162,600 167,500 1 1.7500 1 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 2.249,200 2 2 2.0% 2.0% 2.0% 2.0% 2.0% 2.0% 2 2.0% 2.0% 2.0% 2.0% 2.0% 2.0% 2.0% 2.0% 2.0% 2.0% 3.0%	383,000 38	36	350.500	274 900	269 510	Growth Adjustment
3.0% 4.2600 162,600 167,500 1 1.102 1.129 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 2.242,000 2.29,200 2.29,200 2.29,200 2.20,200<	3.0%	,		26	269,510	System Maintenance
3.0% 162,600 167,500 1 1.132 1.180 1.189 1.219 1.249 1.249 1.249 1.249 1.249 1.249 1.249 2.	221,900				171,528	Adjusted Connections/ Disconnects wh CPI
3.0% 1.57,900 1 1.25,900 1 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 1.249 2.249,200 2.29,200 2.29,200 2.29,200 2.29,200 2.29,200 2.29,200 2.20,200 2.24,200 2.24,200 2.24,200 2.24,200 2.24,200 2.24,200 2.24,200 2.20,600<	1.132				1.000	CPI Adjustment
3.0% 3.0% <th< td=""><td>196,000 20</td><td>18</td><td>17</td><td>17</td><td>171,528</td><td>Adjusted Connections/ Disconnects</td></th<>	196,000 20	18	17	17	171,528	Adjusted Connections/ Disconnects
3.0% 167,500 167,500 167,900 157,900 159,500 1.24 </td <td>3.0%</td> <td></td> <td></td> <td></td> <td></td> <td>Growth Adjustment</td>	3.0%					Growth Adjustment
3.0% 3.0% <th< td=""><td>190,300</td><td></td><td></td><td></td><td>171.528</td><td>Connections/ Disconnects</td></th<>	190,300				171.528	Connections/ Disconnects
3.0% 3.0% <th< td=""><td>168,400 17</td><td>1</td><td>_</td><td>-</td><td>118,686</td><td>Adjusted Field Customer Service wh CPI</td></th<>	168,400 17	1	_	-	118,686	Adjusted Field Customer Service wh CPI
3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0%	1.132				1.000	Adjusted Field Custoffiel Service CPI Adjustment
3.0% 3.0% 3.0% 3.0% 3.0% 3.0% 3.0%	148,800	14	_	12	118 686	Adjusted Field Customer Conice
100,000 170,000	3.0%			2.0%	110,000	Field Customer Service
136 200 140 200 148 200 153 300 157 900 162 600	144 500		424 400		315,166	Adjusted Phone Customer Service wn CPI
1.077 1.104 1.102 1.100 1.100 1.100 1.100 555,800 58	447 500 4	_			1.000	CPI Adjustment
3/2,000 383,000 393,300 401,200 413,400 72,5	1 132		3	S.	315,168	Adjusted Phone Customer Service
3.0% 3.0% 3.0% 3.0% 3.0%	3.0%	3				Growth Adjustment
361,700 372,600 383,800 395,300 407,200 419,400 432,000 44	383,800 39	36	32	315,168	315,168	Phone Customer Service